UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,917	07/03/2003	Stephen G. Evangelides JR.	9005/20	4644

27774 7590 08/09/2006

MAYER & WILLIAMS PC
251 NORTH AVENUE WEST
2ND FLOOR
WESTFIELD, NJ 07090

EXAMINER	
GARCIA, LUIS	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/613,917	EVANGELIDES, STEPHEN G.	
	Examiner	Art Unit	
	Luis F. Garcia	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *July 3, 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *July 3, 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because in FIGs. 1,4,5,6 the words, lettering and/or numbering are not clear; furthermore, there are two sets of page numbers for FIGs. 5 and 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 18 recites the limitation "the cabled" in ln2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 41 and 42 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what "period" is referring to in the claims, e.g. the length of the transmission path or the dispersion value of the dispersion map. Based on pg7 ¶32 "period" is hereinafter taken to mean "length", but claimed use of the word "period" does not clearly distinguish this.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1-4, 6-12, 15-17, 19-21, 23-31, 34-35, 38-47 and 50-51** are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuda et al (US 7,068,876); Tsuda et al hereinafter referred to as Tsuda.

Regarding claim 1, Tsuda discloses an optical transmission system, comprising: a first transmitter unit **(FIG. 1 (2-optical transmitter))**; a first receiver unit **(FIG. 1 (4-optical receiver))**;

a first optical transmission path interconnecting the first transmitter unit and the first receiver unit **(FIG. 1 (6-transmission line) in which the transmission line (transmission path) interconnects the transmitter and the receiver)**, said first optical transmission path being defined by at least three transmission spans **(FIG. 1 (6-transmission line, $8_{\#1-4}$-segments) in which the optical transmission line (transmission path) is defined by at least three transmission segments (spans))**, said first optical transmission path having a periodic dispersion map with a first periodic component comprising a fixed portion and an adjustable portion **(FIG. 1 ($8_{\#3}$-fiber segment, $10_{\#3}$-optical amplifier) in which the first periodic component comprises a fiber segment (fixed portion) and an adjustable dispersion compensator (adjustable portion)(e.g. col7 ln2-45: variable dispersion compensator located within the optical amplifier)))**

and a second periodic component greater in length than the first periodic component **(FIG. 1 ($8_{\#1-2}$-segments, $10_{\#1-2}$-optical amplifiers) in which the second periodic component (e.g. segments $8_{\#1-2}$) are greater in length then the first periodic component (e.g segment $8_{\#3}$) as seen in FIG. 5 and example in col8 ln34-37 in which all the segments are of equal length; therefore, segments $8_{\#1-2}$ are twice the length of segment $8_{\#3}$)**, said fixed portion of the first periodic component of the periodic dispersion map being provided by the respective transmission spans **(FIG.**

1 ($8_{\#3}$-segment) in which the segment on the first periodic component provides the fixed portion of the periodic dispersion map (e.g. each fiber has a fixed dispersion slope as seen in FIG. 4/col5 ln62-67 to col6 ln1-7));

a plurality of optical repeaters each optically coupling adjacent ones of the transmission spans to one another **(FIG. 1 ($10_{\#1-3}$-optical amplifiers) in which the optical amplifiers (repeaters) each optically couple adjacent segments (spans) to one another)**;

a first plurality of adjustable dispersion trimming element each located in one of said optical repeaters and optically coupling one of said transmission spans to an optical amplifier located in said one optical repeater **(FIG. 1 ($10_{\#1-3}$-optical amplifiers) and FIG. 2B (10-optical amplifier, DC-dispersion compensator) in which a dispersion compensator is located in each optical amplifier (repeater), each optically coupling the optical amplifier to the fiber segment(s). NOTE: DC-dispersion compensators within the optical amplifiers are variable and selected from a plurality of stepwise varying dispersions-col7 ln2-45)**, said first adjustable dispersion trimming elements each having an adjustable path average dispersion that provides said adjustable portion of the first periodic component **(FIG. 2B (DC-dispersion compensator) and col7 ln22-45 in which each adjustable dispersion compensator (first adjustable dispersion trimming elements) have adjustable dispersions to provide the adjustable portion of the first periodic component. As further seen in TABLES 1 and 2 in which the dispersion compensator in each segment is adjusted based on segment length)**, said adjustable path average

dispersion being selected such that the fixed portion of the first periodic component of the periodic dispersion map plus the adjustable component of the dispersion map associated therewith has a desired value **(FIG. 5 and col8 ln59-67/col91-2 in which the fixed portion of the first periodic component plus the adjustable component (e.g. FIG. 5 LINE: $10_{\#3}$ to 4) has a desired value (e.g within tolerance of dispersion))**.

Regarding claim 19, rejected as stated in claim 1 rejection in which adjusting the dispersion compensators in each optical amplifier (e.g FIG. 2B and col7 ln22-45) allows for the selection of a periodic dispersion map in each segment based on fixed and adjusted dispersion.

Regarding claim 38, rejected as stated in claim 1 apparatus rejection in which assembling the optical transmission system is an inherent property of Tsuda's optical system in order to have a working system.

Regarding claims 2 and 20, Tsuda further discloses wherein at least first and second of the at least three transmission spans define the second periodic component of the dispersion map **(FIG. 1 ($8_{\#1\text{-}2}$-segments) in which the first and the second fiber segments (spans) define the second periodic component)**.

Regarding claims 3 and 21, Tsuda further discloses wherein said at least three transmission spans comprises at least four transmission spans, wherein the third and fourth of the transmission spans each have a total path average dispersion different from a path average dispersion of the first and second transmission spans **(FIG. 1 ($8_{\#4}$-fourth segment) in which the fourth segment (fourth span) and the third segment**

(e.g. $8_{\#3}$-third span) each have a total path average dispersion different from the first and second spans (e.g $8_{\#1-2}$-first and second segment) as disclosed in FIG. 5 in which the first and second spans have a different total dispersion then the third and forth paths).

Regarding claim 4, Tsuda discloses the optical transmission system of claim 1 as applied above.

Tsuda further discloses wherein the first and second transmission spans plus the dispersion trimming elements respectively constitute the second periodic component of the dispersion map **(FIG. 1 ($8_{\#1-2}$-segments, $10_{\#1-2}$-optcial amplifiers) in which the second periodic component contains the first and second transmission segments (spans) plus the adjustable (trimming) dispersion compensators located within the optical amplifiers as disclosed in FIG. 2B)**.

Regarding claims 6 and 39, Tsuda further discloses wherein each of the optical repeaters in the plurality of optical repeaters is substantially identical to and interchangeable with one another **(FIG. 2B in which the optical amplifiers are identical to FIG. 2B; thereby, making them interchangeable)**.

Regarding claim 8, rejected as stated in claim 1 rejection.

Regarding claims 9, 23, 25, 28 and 45, Tsuda further discloses wherein each of the adjustable dispersion trimming elements is coupled to an input of one of the optical amplifiers **(FIG. 2B (10-optical amplifier, DC-dispersion compensator) in which the adjustable dispersion compensator is coupled to an input of the optical amplifier)**.

Regarding claims 10, 26, 29 and 46, Tsuda further discloses wherein each of the adjustable dispersion trimming elements is coupled to an output of one of the optical amplifiers **(FIG. 2B (10-optical amplifier, DC-dispersion compensator) in which the adjustable dispersion compensator is coupled to the output of the optical amplifier)**.

Regarding claims 11 and 30, Tsuda further discloses wherein said fixed portion of the periodic dispersion map is approximately equal to zero **(FIG. 4 (SMF, DSF) in which the fiber segments of FIG. 1 ($8_{\#1\text{-}3}$) (fixed portion of periodic dispersion map) are composed of SMF or DSF fiber which have approximately zero dispersion at operating wavelengths 1.3nm and 1.55 nm respectively; thereby, making the dispersion map for the fixed fiber segments approximately zero)**.

Regarding claims 12, 31 and 47, Tsuda further discloses wherein said optical amplifier is a rare-earth doped optical amplifier **(FIG. 1 ($10_{\#1\text{-}3}$) and col1 ln19-25 in which an EDFA (rare-earth doped optical amplifier) is used to compensate for fiber loss)**.

Regarding claim 15, 17, 34 and 50, Tsuda further discloses wherein at least one of said transmission spans comprises a cabled optical fiber having a single value of dispersion **(FIG. 4 and col8 ln34-37 in which the a transmission segment (span) is composed of a SMF (single mode fiber) with a single value of dispersion at a given wavelength)**.

Regarding claim 16, 35, 40 and 51, Tsuda further discloses wherein at least one of said transmission spans comprises a plurality of cabled optical fibers each

having a different value of dispersion **(col3 ln41-46 in which the transmission span comprises both SMF and DSF fiber, each having a different value of dispersion-FIG. 4)**.

Regarding claim 24, Tsuda discloses the method of claim 23 as applied above.

Tsuda further discloses wherein said at least one adjustable dispersion trimming element comprises a plurality of adjustable dispersion trimming elements respectively associated with the plurality of optical amplifiers and being optically coupled to a respective one of the transmission spans **(FIG. 1 ($10_{\#1-3}$-optical amplifiers) in which the plurality of optical amplifiers each contain an adjustable dispersion trimming element set based on segment distance (e.g. FIG. 2B and col7 ln2-15))**.

Regarding claim 27, rejected as stated in claim 9 apparatus rejection in which the adjustable dispersion compensator(s) are associated with an optical amplifier (repeater).

Regarding claims 41 and 43, Tsuda discloses the method of claim 38 as applied above.

Tsuda further discloses wherein said transmission path has a dispersion map with a period equal to one of the spans of cabled optical fiber plus the adjustable dispersion trimming element associated therewith **(FIGs. 1,5 in which the dispersion map inherently has a length equal to the length of one of the spans plus the adjustable dispersion compensator. NOTE: "period" is interpreted to be "length" based on pgs6-7 ¶0032 of instant application's Specification)**.

Regarding claims 42 and 44, Tsuda discloses the method of claim 38 as applied above.

Tsuda further discloses wherein said transmission path has a dispersion map with a period greater than one of the spans of cabled optical fiber plus the adjustable dispersion trimming element associated therewith **(FIG. 1 (6-transmission line, $8_{\#1-4}$:segments) in which the transmission line (path) is has a greater period (length) then one of the segments (spans))**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claim 13, 14, 18, 32, 33, 37, 48, 49 and 53 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Tsuda.

Regarding claim 13, rejected as stated in claim 1 rejection in which it is a matter design choice as to which well know adjustable dispersion compensator (e.g. tunable Bragg grating, a trimmed spool of fiber) Tsuda's incorporates as the dispersion compensator in FIG. 2B. For both a tunable Bragg grating, phase tunable couplers and a spool of DCF/SMF/DSF/Non-DSF are all equally applicable.

Regarding claim 14, 32, 33, 48 and 49, rejected as stated in claim 13 rejection.

Regarding claim 18, 37 and 53, rejected as stated in claim 13 in which Tsuda's dispersion compensator has a dispersion value substantially greater then the single dispersion value of the cabled optical fiber as seen in FIG. 4 (SMF, DSF) in which their respective single dispersion values are substantially zero at 1.3,1.55nm and FIG. 5 (at $10_{\#1\text{-}3}$) in which the dispersion compensators have a substantially greater single dispersion value then the SMF, DSF segments. For example TABLEs 1,2 in which each dispersion compensator located within each optical amplifier has a substantially greater absolute single dispersion value then the segments, e.g. –600,-800,-1000 ps/nm.

Regarding claim 36, rejected as stated in claim 17 apparatus rejection.

Regarding claim 52, rejected as stated in claim 15 apparatus rejection.

5. **Claim 5, 7 and 22 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Tsuda in view of Robinson et al (US 6,005,997); Robinson et al hereinafter referred to as Robinson.

Regarding claim 5, Tsuda discloses the optical transmission system of claim 1 as applied above.

Tsuda does not expressly disclose comprising: a second transmitter unit associated with the first receiver unit;

a second receiver unit associated with the first transmitter unit;

a second optical transmission path interconnecting the second transmitter unit and the second receiver unit, said second optical transmission path being defined by at least three second transmission spans, said second optical transmission path having a

periodic dispersion map that is equal to said periodic dispersion map of the first optical transmission path as experienced by an optical signal traveling from the second transmitter unit to the second receiver unit; wherein said plurality of optical repeaters each include a second adjustable dispersion trimming element each optically coupling one of said second transmission spans to an optical amplifier located in each repeater.

Robinson teaches a second transmitter unit associated with the first receiver unit **(FIG. 1 (114-LTE) in which a second transmitter is associated with a first receiver unit, both located at LTE-114 and transmitting via different respective paths)**;

a second receiver unit associated with the first transmitter unit **(FIG. 1 (110-LTE) in which a second receiver is associated with a first transmitter, both located at LTE-110)**;

a second optical transmission path interconnecting the second transmitter unit and the second receiver unit **(FIG. 1 in which a second transmission path interconnects the second transmitter and the second receiver)**, said second optical transmission path being defined by at least three second transmission spans **(FIG. 1 in which the transmission path is defined by at least three transmission spans)**; wherein said plurality of optical repeaters each include a second dispersion element each optically coupling one of said second transmission spans to an optical amplifier located in each repeater **(FIG. 1 (176-196-Dispersion Compensating Modules) and col3 ln66-67 to col4 ln1-8 in which the optical amplifiers (154-174) include a dispersion compensating module (176-196), each optical coupling the transmission span (130-152) to the optical amplifier)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Tsuda and incorporate Robinson's teachings of a bi-directional WDM system with optical amplifiers that include dispersion compensation modules. The motivation being that this allows the communication system to transmit and receive optical signals from the same node; thereby, making the optical system more serviceable to users on both sides.

Regarding claim 7, Tsuda in view of Robinson disclose the optical transmission system of claim 5 as applied above.

Tsuda further discloses wherein each of the optical repeaters in the plurality of optical repeaters is substantially identical to and interchangeable with one another **(FIG. 2B in which the optical amplifiers are identical to FIG. 2B; thereby, making them interchangeable)**.

Regarding claim 22, Tsuda discloses the method of claim 19 as applied above.

Tsuda does not disclose wherein said optical transmission path is a bidirectional transmission path and further comprising a plurality of optical repeaters in which the optical amplifiers are respectively housed, wherein each of the optical repeaters in the plurality of optical repeaters is substantially identical to and interchangeable with one another.

Robinson teaches wherein said optical transmission path is a bidirectional transmission path **(FIG. 1: bidirectional transmission path)** and further comprising a plurality of optical repeaters in which the optical amplifiers are respectively housed, wherein each of the optical repeaters in the plurality of optical repeaters is substantially

identical to and interchangeable with one another **(FIG. 1 (154-174: optical amplifiers) in which the bidirectional transmission path comprises substantially identical optical amplifiers. NOTE: because the optical amplifiers are substantially identical, they are therefore interchangeable with one another)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Tsuda and incorporate Robinson's teachings of a bi-directional WDM system with optical amplifiers that include dispersion compensation modules. The motivation being that this allows the communication system to transmit and receive optical signals from the same node; thereby, making the optical system more serviceable to users on both sides,

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER